

Precompressed Gas Diffusion Layers for Electrochemical Cells

Abstract

A method is provided for making a gas diffusion layer (GDL) for an
5 electrochemical cell comprising the steps of coating a surface of a plain-weave carbon
fiber cloth with a layer comprising carbon particles and one or more highly fluorinated
polymers to make a coated plain-weave carbon fiber cloth, and compressing the coated
plain-weave carbon fiber cloth to a compression of 25% or greater. Typically the GDL
according to the present invention can be incorporated into a membrane electrode
10 assembly (MEA) comprising a very thin polymer electrolyte membrane (PEM),
typically having a thickness of 50 microns or less, without increased shorting across the
PEM even when the MEA is under compression. A membrane electrode assembly
(MEA) is also provided comprising a gas diffusion layer that comprises a plain-weave
carbon fiber cloth, and comprising a polymer electrolyte membrane (PEM) having a
15 thickness of 50 microns or less, where the membrane electrode assembly (MEA) has an
electrical area resistance of $400 \text{ ohm} \cdot \text{cm}^2$ or greater when compressed to 25%
compression.